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World city topologies

Richard G. Smith

Department of Geography, University of Leicester, University Road, Leicester
LE1 7RH, UK

Abstract: This paper develops ideas from poststructuralism, actor-network theory, non-representational theory and complexity theory to begin to produce a topological consideration of cities in global networks. In other words, the paper argues that fluids and flows, actant networks, performances and practices fold the spaces and times of cities in ways that question the privileging of geometrical space (near and far) and linear time (now and then) in explanations of global and world cities. To reach a conceptualization of world city topologies, the paper is in four parts. First, space is set free and rethought as everywhere and folded into everything. Second, time is rethought as non-linear, multiple and folded into everything. Third, these new conceptualizations of space and time are mobilized to challenge the spatialities and temporalities produced through the political-economy approach of a writer such as Saskia Sassen. Finally, my rethinking of space and time in globalization is worked through to portray global and world cities as 'Bodies without Organs'. This spatial formation is seen to be one that connects and disconnects through networks and folds. Overall, my rethinking of space, time, globalization and cities produces a spatiotemporal pattern or topology that defies familiar geographical borders and temporal frames to point to the spaced and timed quality of relations that stretch.

Key words: space, time, poststructuralist theory, actor-network theory, non-representational theory, complexity theory.

I Introduction

Nothing ever begins. There is no first moment; no single word or place from which this or any other story springs. The threads can always be traced back to some earlier tale, and to the tales that preceded that . . . Nothing is fixed. In and out the shuttle goes, fact and fiction, mind and matter, woven into patterns that may have only this in common: that hidden amongst them is a filigree which will with time become a world.

Barker (1995: 5)

There's nothing more unsettling than the continual movement of something that seems fixed.

Deleuze (1995: 157)

If spaces and times are created there is no particular reason why they should be consistent with one another . . . it seems likely that *spaces and times are multiple*.

Law and Hetherington (2000: 47)

Something exciting is happening in urban studies. A great experiment is afoot as slowly but surely old urbanism (the familiar or conventional urban studies we have become accustomed to) is being rejected and a new urbanism is coming into focus. The threat of an impasse in urban theory that Thrift (1993) identified some years ago seems a distant memory as a new urbanism based around globalization and an ontology of movement, networks, flows, fluids, folds, mobilities, nonhumans, practices and complexity is becoming more and more recognizable (see, for example, Amin and Thrift, 2002; Smith, 2003a; 2003b; Thrift, 1998). In fact, the emergence of actor-network theory (ANT) out of some strands of poststructuralist thought (Deleuze in particular), and the emergence of non-representational theory (Thrift, 1996; 2000) and complexity theory (Byrne, 1998; Cilliers, 1998; De Landa, 1997; Rasch and Wolfe, 2000; Thrift, 1999; Urry, 2003)¹ is leading to a rethink not only of urban studies but also of social sciences such as sociology (Bauman, 2000; Urry, 2000a; 2003)² and human geography (Doel, 1999; Thrift, 1996; Whatmore, 2002).³

As a part of the production of a new urbanism, Thrift (1998) turned his attention a few years ago to the global/world cities literature. His intervention will serve as my starting-point for a rethinking of the spacing and timing of world cities.⁴ Thrift noted that the literature on world cities seemed to have come to a 'dead stop' (1998: 54). He listed four main 'dissatisfactions' with the existing literature. While I would question one of his dissatisfactions,⁵ his observation that there is a lack of innovative theorization and research on the spaces and times that world cities inhabit struck me as a significant 'black hole' in the literature.⁶ On the question of space, Thrift asks whether the idea of world cities as being in local or global space is now '... even a sensible distinction in the contemporary world of movement, diaspora, and multiple but partial connection?' (1998: 54). In this paper, I will pick up some of the ideas Thrift highlights and contextualize them to produce both a theorization of space and then a critique of Sassen's (and by implication other political economists') scalar view of globalization and world cities. On the question of time, Thrift argues that 'World cities must not be seen as a succession of bounded states, however heterogeneous, frozen in temporal aspic', but rather as 'always interactive and constantly in process' (1998: 54–55). For Thrift, time is a product of practices and performances, and world cities are as much about the time of the deed as the time of the word – see Thrift's (1996; 2000) explanation of his non-representational theory (see also Smith, 2003a). In this paper, I contextualize this agenda of rethinking the temporalities of world cities and run with it to produce a theorization that is open to the polyrhythmic world city – a liquid theatre alive with the unruly times of urban practices.

In short, this paper tries to move further towards some answers to the questions Thrift identifies over the spacing and timing of world cities. Developing ideas from poststructuralism, ANT, non-representational theory and complexity theory, the paper strives to challenge dominant thinking about space, time and scale in the literature on globalization and world cities. The paper contributes to a topological understanding of globalization (see Amin, 2002) and world cities that is both non-scalar and non-linear as it defies both geographical borders and temporal frames. The paper takes the view that with globalization space and time are pliable and moveable constructions that might or might not correspond to the spaces and times of nation states.

II Spacing world cities

In central London or New York, one cannot see or feel its limits – the city is boundless, perfectly labyrinthine.
Raban (1975: 243)

One does indeed find folds everywhere

Deleuze (1995: 156)

Space is folded into everything and is so important that it is difficult to write about. That is quite a statement, and so let me explain how it was arrived at. I think that when thinking about space an interesting place to jump into the debate is with Dandieu (a contemporary of Bataille).⁷ Dandieu was critical of the dominant conceptualizations of space in the early twentieth century:

There is no notion more worthy of being cherished than that of space. For that reason it has twice been betrayed: the first time by those who have delivered space over to the geometers, thus reducing it to an abstraction; the second time by the inventors of concrete time, romantics and Bergsonians who, subordinating space to time, under the cover of creative evolution, have initiated the most slipshod spiritualism yet seen. (Dandieu, in Bataille *et al.*, 1995: 77)

Here Dandieu is critical of both the geometers of space (the Cartesians with their mathematical spaces) and the Bergsonians with their ideas regarding creative evolution and concrete time. Dandieu follows Meyerson in criticizing creative evolution because the idea subordinates space to time in its movement from a space that is solid, discontinuous and concrete to a space that is a continuous abstract extension (mathematical time):

The first implies an adhesion to a thing, concrete and limited, the reality of the diverse, of the discontinuous, of transitive action by contact or impact; the second, which is nothing other than Cartesian extension, supposes on the contrary the rationality of the real, the logical and icy monism of scientists. (1995: 78)

The beauty of Dandieu is that the basis of his criticism actually relies on arguing that this duality of space is no more than a product of different degrees of abstraction. Drawing on the work of Minkowski on *Schizophrenia*, he refers to the clinical observations that distinguish the general paralytic from the schizophrenic. The paralytic is anterior to any intellectual datum, but nevertheless retains the notion of *I-here-now* and thus some contact with the real. In contrast, the schizophrenic has lost the notion of *here-now* (where the here appears to dominate and condition the now), but 'has in no way lost the notion of Cartesian space . . .' (1995: 78). Dandieu rightly points to degrees of abstraction, but his distinction between the abstract and the concrete is problematic because the dualism manufactures distinct and separate geographical scales. Here the global and local are distinguished so that the former is abstract, remote and unaccountable while the latter is concrete, familiar and accountable.

Despite the writings of surrealists such as Dandieu, it was Foucault who most famously introduced space to time-orientated social theory because poststructuralism has become such a significant intellectual movement. In answering several 'Questions on geography', Foucault (1980: 70) asked: 'Did it start with Bergson or before? Space was treated as the dead, the fixed, the undialectical, the immobile. Time, on the contrary, was richness, fecundity, life, dialectic.' Indeed, Foucault is widely credited with foregrounding space over time and is often cited as an origin to the 'spatial turn' (Jameson, 1991) that has become one of the chief interests of the social sciences and

humanities in recent decades. Foucault was exceptional because he was quick to see the necessity of a shift in thinking away from an overemphasis on history to an appreciation of the importance of geography in the contemporary world (Foucault, 1986: 22):

The great obsession of the nineteenth century was, as we know, history: with its themes of development and of suspension, of crisis and cycle, themes of ever-accumulating past, with its great preponderance of dead men and the menacing glaciation of the world . . . The present epoch will perhaps be above all the epoch of space. We are in the epoch of simultaneity: we are in the epoch of juxtaposition, the epoch of the near and far, of the side-by-side, of the dispersed. We are at a moment, I believe, when our experience of the world is less that of a long life developing through time than that of a network that connects points and intersects with its own skein.

Foucault adopts the spatial metaphor of the network to predict a world of simultaneity where spaces are a challenge to categories such as the local and global or the near and the far because they are multiple and folded.

A contemporary of Dandieu was Bataille, who has something interesting to say even after Foucault (although he wrote years before Foucault). In a sense, Bataille goes even further than Foucault because he argues that, no matter how you divide and categorize it, space remains an escapologist *par excellence*. For Bataille, space is not only more than the space of astronomers and physicists, it is also a Houdini escaping and defying those philosophers of space who have time and time again asserted how space should behave under all circumstances. With not a little humour, Bataille (1995: 75–77) put it well and provocatively when he pointed out that:

Without one's being able to say why, it seems that an ape dressed as a woman is no more than a division of space. In reality, the dignity of space is so well established and associated with that of the stars, that it is incongruous to assert that space might become a fish swallowing another. Space will be still more frightfully disappointing when it is said that it takes the form of an ignoble initiation rite practised by some Negroes, desperately absurd, etc . . .

Space, it seems, is not as formal as we have been led to believe. For Bataille, space flees and eschews the categories that are imposed on it (e.g., the shapes of geometers, the scales of geographers and cartographers, the abstract-concrete dualities of writers such as Dandieu). Bataille (1995: 75) points out that space ' . . . remains a lout, and it is difficult to enumerate what it engenders. It is as discontinuous as it is devious . . . space breaks all obligatory continuity.'

In short, with Dandieu we learn that geographical scales (or spaces) are no more than degrees of abstraction. With Foucault, we move beyond the duality of space proposed by Dandieu between concrete and abstract scales to begin to argue for a skein of networks that is characterized by non-linear experiences such as simultaneity and juxtaposition (where the idea of concrete local and abstract global scales, spaces or times makes no sense). Finally, with Bataille we see space as a lout that defies all categories and is folded into absolutely everything. Indeed, for Bataille geographical scales are little more than straitjackets and space should be set free, let loose, to be boundless, everyday, in everything and everywhere. Yet there is much more to be said about space.

An anecdoted topography of chance (1995) is a record of the avant-garde Fluxus artist Daniel Spoerri's decision (following a rambling conversation with a friend) to map and describe the objects lying at random on the table in his room. On that day there happened to be 80 objects and traces present ranging from a piece of white bread to a worm-eaten joined wooden box to a cigarette burn. In addition to his listing and

description of such everyday detritus, Spoerri's friends also contributed to each entry as the objects evoked wider associations, memories and anecdotes. What transpires, is unleashed, is a potentially infinite and multiple process so that the book appears '... like a stroll taken in every direction at once' (1995: 12). An example of an entry in the *Topography* is below, and has been selected here because it echoes most explicitly the horizontal achievement of Spoerri and his friends (Spoerri, 1995: 102):



34c. Ball of scrap wire cut from the backs of snare-pictures (I use wire to fasten some objects), picked up and saved through false economy.^a

a. Aha! Horizontality! (The fact that it can be rolled up and even more, and that the entire world is just a tangled ball because people have all rolled up their horizon with themselves included – all one big ball. The fact is though, that the ball here, the world, is actually just the great wide horizon.) That's been done quite according to the book! (DR 1968).

The achievement of Spoerri and his friends is that they portray the world as a horizontality of relations. There is no separation of humans and objects, just lines that mix and mingle like a ball of scrap wire. A multiple garbage tip, and an infinite tangle of associations. In short, Spoerri and his friends have produced a book that is in important ways analogous to how Deleuze, and ANT, visualize space and networks.

Before ANT and non-representational theory there was poststructuralism and the genius of Deleuze (often with Guattari), but his ideas have received scant attention in urban studies (an early though brief exception is Shields, 1996). Deleuze can help us conceptualize world city topologies because he gave much thought to the idea of space-time as folded. Deleuze's poststructuralist philosophy is one where boundaries, scales and territories vanish through deterritorialization as the world is conceptualized as a living dermis with an infinite bundle of (un)folds and surfaces that make space and time. For Deleuze and Guattari, philosophy is akin to the Japanese art of origami – folding, unfolding, refolding (Deleuze, 1993). Their world is one of lines that intersect and weave: 'We think lines are the basic components of things and events. So everything has its geography, its cartography, its diagram' (Deleuze, 1995: 33). There are no points in their philosophy (they hate pointillism), rather what would interest them is the lines that make up globalization and the city: 'I tend to think of things as sets of lines to be unravelled but also to be made to intersect. I don't like points . . . Lines aren't things running between two points; points are where several lines intersect. Lines never run uniformly, and points are nothing but inflections of lines. More generally, it's not beginnings and ends that count, but middles' (Deleuze, 1995: 160–61). What interests Deleuze are (un)folds, the infinite labyrinth of fold to fold that produces the world's topology as one of process that overwhelms the fictions of boundaries, limits, fixity, permanence, embedment. What is important to realize, as I come on to ANT, is that all folds are equally important, there are no masters and no servants, '... folds cannot be distinguished in terms of the essential and the inessential, the necessary and the contingent, or the structural and the ornamental. Every fold plays its part: every

fold splays “it” apart. The event of origami is in the (un)folding, just as the gift is in the wrapping: not as content, but as process’ (Doel, 1999: 18).

What the folds of Deleuze mean for the issue of propinquity has been taken up by some ANT theorists (e.g., Latour, 1993; Law and Hetherington, 2000; Serres, with Latour, 1995). They observe that the near and far become less meaningful when a metric theory of space (and time) is rejected in favour of a topological theory where space-time is viewed as folded, crumpled and multi-dimensional:

If you take a handkerchief and spread it out in order to iron it, you can see in it certain fixed distances and proximities. If you sketch a circle in one area, you can mark out nearby points and measure far-off distances. Then take the same handkerchief and crumple it, by putting it in your pocket. Two distant points suddenly are close, even superimposed. If, further, you tear it in certain places, two points that were close can become very distant. This science of nearness and rifts is called topology, while the science of stable and well-defined distances is called metrical geometry. (Serres with Latour, 1995: 60)

The coordinates of distance and proximity are transformed by a folding, refolding and unfolding that eschew ideas such as linearity. A topological (see Mol and Law, 1994; Murdoch, 1998), rather than a geometrical, spatial configuration emerges. If that seems like a rather abstract, remote and detached portrayal of space, however, then a more accessible rendition can be found in Latour (1997a: 3):

I can be one metre away from someone in the next telephone booth, and be nevertheless more closely connected to my mother 6000 miles away; an Alaskan reindeer might be ten metres away from another one and they might be nevertheless cut off by a pipeline of 800 miles that makes their mating for ever impossible; my son may sit at a school with a young Arab of his age but in spite of this close proximity in first grade they might drift apart in worlds that become at later grades incommensurable; a gas pipe may lie in the ground close to a cable television glass fiber and nearby a sewage pipe, and each of them will nevertheless continuously ignore the parallel worlds lying around them.

Here we learn not only that space does not add up (Thrift, 1998), but that space is also rather messy, complex, juxtaposed, or perhaps that there are many kinds of space. In fact, for ANT theorists and any study of world city actor-networks (Smith, 2003a), the details and the so-called mess (just as Spoerri showed) are crucially important for getting at just how networks lengthen and endure (see Callon and Law, 1995, and the discussion by Law and Hetherington, 2000, of a laboratory’s Managing Director). I would add, in light of complexity theory, that in conceptualizing globalization the details might be crucial precisely because there can be a lack of proportionality between ‘causes’ and ‘effects’ (think of Lorenz’s famous ‘butterfly effect’; see also Law, 2000) and vice versa: ‘Once the global financial networks reached a certain level of complexity, their nonlinear interconnections generated rapid feedback loops that gave rise to many unsuspected emergent phenomena’ (Capra, 2002: 121).

In this section, we have moved on from the frozen assumptions of structuralism to a fluid poststructuralist perspective, but enough of space for now – can time also be set free?⁸ Let us take authors such as Massey (1997: 218–19) seriously when she insists on the inseparability of space and time:

There is this notion that space is orthogonal to time. You take a cross-section through all the movement and flux and development . . . a slice through time . . . and there you have it – *space*.

Space as the layout of things, caught in a moment
or space as the structure of the whole, held in an a-temporal
synchrony.

Space as cross-section
or space as the structures of the structuralists.

Space as representation, as the fixation of meaning.
 The contemporaneity of the instant
 or the a-temporality of the structure.
 It is a view (or a set of views, actually) authorized by an assumption so deep it seems impertinent to mention it.

What happens if the non-Euclidean poststructuralist topological account of space outlined in this section is a reference, but not a frame, for our understanding of time?

III Timing world cities

Time is not a general framework but a provisional result of the connection among entities.

Latour (1993: 74)⁹

Time in Earl's Court is quite different from time in Islington.

Raban (1975: 197)

Although time is irreversible, time is both multiple and unpredictable.

Urry (2003: 22)

Perhaps the most dominant narratives about time and space in academic debates about globalization have been those of time-space distancing (Giddens, 1990; 1991) and time-space compression (Harvey, 1989; cf. time-space convergence, Janelle, 1968).¹⁰ These arguments are well known and have come under criticism (see, for example, Thrift, 1995), but perhaps even more dominant than these academic narratives are two more popularly held ideas about time in global and world cities. First, there is the notion that world cities are connected through financial markets that are non-stop as they operate around the clock on a 24-hour basis (this idea is reinforced through 24-hour news channels which endlessly report on the world's financial markets). The notion is that in the world of international finance money flows, or capital switches, with instantaneous ease from space to space and time to time. However, the work of Thrift (Leyshon and Thrift, 1997; Thrift and Leyshon, 1992; Thrift, 1998) on monetary geographies as networks of associations reveals that this idea is something of a myth. In fact, global monetary networks of both the past and the present are not frictionless or necessarily fast (see, for example, Thrift, 1998, on the differences between foreign-exchange markets, trading in US Treasury Bonds and small-value payment systems). What the networks do require is constant work and maintenance by the actants in that network who collectively carve out (and measure) a multitude of times and spaces for financial transactions that may or may not conform to popular expectations. Second, there is the idea of 'the 24 hour city' (Kreitzman, 1999) that was popularized as a city marketing strategy in the 1990s. While the popular idea of 24-hour markets is a rather limited monochronic idea of time *across* global and world cities that belongs to economic globalization and conventional ideas about the length of the 'business day', the 24-hour city is a monochronic idea of time *in a* global or world city. Kreitzman (1999) has written about how cities are imposing a new temporal organization on the city discarding the 9 to 5 working day '... to exploit the economic, social and cultural benefits of 16, 18 or 24 hour levels of activity' (1999: 137). To be a global city (to appear 'busy' like London, New York or Tokyo), to attract capital and capitalize on it, cities such as Birmingham or Manchester in the UK and San Francisco or Seattle in the USA

have rethought their urban design and have striven to produce 'cultural quarters' to attract and encourage people to live in the city centre and thus help fuel an evening economy. In short, both of these popular ideas about time are monochronic and linear rather than polychronic and multiple.

If popular discourses about time in global and world cities are linear,¹¹ and if the general recipes of time and space proposed by academics such as Giddens (1990; 1991) and Harvey (1989) are too, then how else might we think about the timing and chronotopography of world cities? A starting-point might well be the film *Night on Earth* (Jarmusch, 1991) which opens with the image of a spinning globe and revolves around, or has as a motif, the idea of simultaneity. The film concerns five taxi journeys, in five cities (two of the cities are in the USA, and three are in western Europe), on one night on Earth. The five trips all have a theme: the first concerns class, the second ethnicity, the third disability, the fourth religion and the fifth tragedy. The film offers wonderful passing cinematic snapshots of the cities and their different topologies – for example, the sights and sounds of New York at night from Times Square to Brooklyn stand in stark contrast to the windy streets and plazas of Rome. The film also offers interesting insights into different experiences of the city – for example, the blind passenger in the Parisian taxi talks about the sounds of the city, the feel of the city, and the feel of the city's colours. However, the interesting aspect of the film for the purposes of this paper are that the five taxi journeys all start at the same time: in Los Angeles at 19:07, New York at 22:07, Paris at 04:07, Rome at 04:07, and Helsinki at 05:07. At the start of each separate journey-story we are presented with clocks going backwards to these times so that each story starts at the same time. The five journeys stretch from sunset to sunrise and powerfully reinforce the idea that what is important about time is that it is multiple and local.

The clocks in the film provoked me to think of the clocks that seem to time the beat of global and world cities. The wall of clocks that start each scene in the film is the same as those to be found on the walls at many international airports, hotels and businesses. You are often faced by a row of clocks that in a visual cliché display the time in New York, London, Tokyo (other cities are also displayed, but tend to be there because of where you are, or where the firm whose office you happen to be in has business operations¹²). These rows of clocks give the impression of a business, an economy, and a global or world city that operates around the clock on a 24-hour basis. It suggests a view of time as a one-dimensional line travelling from past to present to future. But the film shows that the seamless linearity that the clocks presuppose is no more than a powerful fiction because time is local and multiple developing more like the flight of a wasp than along a line (see Serres, with Latour, 1995: 65). That is to say that time is not like the ubiquitous wall of clocks that in *Night on Earth* indicate the start of each separate city segment. Rather time is what unfolds (and folds and refolds) in each segment of the film precisely because time is not singular but multiple, '... constructed in different ways in different places, according to different purposes' (Thrift, 1998: 55). In other words, please do not confuse time with the measurement of time.

The notion of a linear time that is continuous and cumulative has come under considerable scrutiny by many writers (Adam, 1995; Bender and Welbery, 1991; De Landa, 1997; Glennie and Thrift, 1996; May and Thrift, 2001; Raban, 1975; Serres, with Latour, 1995). For such writers the 'row of clocks on a wall' cliché that is so common in a global or world city would be melting and warped liked Dali's famous painting 'The

Persistence of Memory' because '... time is a polymorphous history of "folds" which wrap around or melt into each other, producing a world of cross-talk, cross-tabulations, cross-infection and criss-crossing, a world of broad temporal sweeps but also of scattered pockets, tatters and emergencies' (Thrift, 1998: 55). In other words, international standard time – the invention of serial time – is a fiction that hides the simultaneity of the world and, consequently, 'Time should be decartelized, and everyone should set his or her own' (Ballard, 1992: 279). Yet even that view of globalization, of global simultaneous multiple time, is too unified. Time is too complex to be absolutely defined (cf. Newton's absolute time; see Serres, with Latour, 1995; Urry, 2003). Time is not simply simultaneous and multiple, it is with globalization increasingly non-linear and complex. With globalization, any event can have unexpected, disproportionate and emergent effects that are often distant in time and space from when and where they occurred. What is needed then is a more chaotic theory of time if we are to better appreciate that the networks in which global and world cities are involved are not stable precisely because when networks are immersed in time they '... fluctuate, become very unstable, and bifurcate endlessly' (Serres, with Latour, 1995: 109).

With the temporalization of networks, there is constant movement, vibration and everything is fluid: '... one must concede that everything is not solid and fixed and that the hardest solids are only fluids that are slightly more viscous than others. And that edges and boundaries are fluctuating. Fluctuating fluid' (Serres, with Latour, 1995: 107). A world of transitory hardenings and fluids leads one to think of mixtures, and so let me turn now to think about what this rethinking of space and time means for scales, boundaries and the limits of global and world cities.

IV Scaling world cities?

If things aren't going well in contemporary thought, it's because ... analysis in terms of movements or vectors is blocked.

Deleuze (1992: 281)

Globes make my head spin. By the time I locate the place, they've changed the boundaries.

McLuhan *et al.* (1997)

The sociologist Sassen is famous for her work on the idea of the global city (1991). Building on this agenda, Sassen (1999; 2000a; 2000b) has in recent years become a kind of cartographer of global capitalism drawing lines and producing boundaries as a way of thinking about the interaction of nation states and the global economy. Moving beyond the idea of the global city as an interface between global and local, Sassen has been looking for other 'frontier zones', 'border zones', 'regulatory fractures' or 'analytic borderlands' that produce, or are a product of, an overlapping of national and international geographical scales. Sassen has set herself the research agenda of opening up the lines of demarcation that she has represented as separating distinct entities (e.g., the nation state and the global economy). According to Sassen, zones or borderlands can be found where geographical scales overlap and are distinct realms in themselves demanding their own theoretical and empirical specification (Sassen, 2000a: 216):

Given the complexity and specificity of both the global and the national, their interlacing suggests the existence of frontier zones – from the perspective of research and theorization, these analytic borderlands are sure to require independent theoretical and methodological specificity.

For Sassen the national and the global are not mutually exclusive scales but 'overlap and interact in ways that distinguish our contemporary moment' (p. 215). In other words, Sassen is keen to observe that strategic (partial and specific) economic globalization produces new spatialities and temporalities that somehow have consequences for the spatiotemporalities of nation states. She speculates that, while 'each sphere, global and national, describes a spatiotemporal order with considerable internal differentiation', both spheres have a 'growing mutual imbrication with the other'. The production of new spatialities and temporalities by strategic economic globalization can be found, Sassen suggests, in 'frontier zones' (spaces characterized by the denationalization of some domains once represented as national) because they are to be found in the overlap (dynamic interaction) of the national and the global.

In short, Sassen has a scalar view of globalization so that when scales (and so boundaries) meet they 'overlap' producing 'new zones' that are in need of research. So, out of a theoretical speculation, Sassen launches a new kind of 'area studies'. However, Sassen's arguments are a product of a political-economy approach and as such strike me as being too limited, timid and simplifying as the world is divided into categories and identities (i.e., areas) that do not do justice to the complexity of the world as a set of relations (see also Murdoch, 1995; Dicken *et al.*, 2001). In contrast to Sassen's interest in scales, boundaries and territories, my ontology of globalization fluidifies such solidified thinking revolving around such motifs as fluidity and flow, movement and mobility, folds and networks. A consequence of that ontology – where all that is solid melts into air – is a rejection of scales and boundaries altogether as globalization and world cities are too intermingled through scattered lines of humans and non-humans to be delimited in any meaningful sense.

A rethinking of the 'limits' of the city is needed. If 'the city is everywhere and in everything' (Amin and Thrift, 2002: 1) then a shift away from thinking about boundaries and limits altogether is necessary. The recently deceased Stephen Jay Gould recants a story about boundaries in one of his books. Gould (1991: 200) tells the story of the Siamese-twin girls 'Ritta-Christina' from Sardinia who died in 1829 (Figure 1). The commentators or pundits of that time went to some effort to try to draw a boundary either around the girls (to define as one person) or between the girls (to define as two persons). However, despite all the argument the issue could not be resolved precisely because it had (Gould, 1991: 200):

... no answer expressed in terms these pundits sought. Their categories were wrong or limited. The boundaries between oneness and twoness are human impositions, not nature's taxonomy. Ritta-Christina, formed from a single egg that failed to divide completely in twinning, born with two heads and two brains but only one lower half, was in part one, and in part two – not a blend, not one-and-a-half, but an object embodying the essential definitions of both oneness and twoness, depending upon the question asked or the perspective assumed.

In other words, 'Ritta-Christina' defied the categories of the time (based upon a system of whole numbers and fractions), and pundits at the time were unable to make the jump to thinking of the girls as a continuum (a plane of consistency).¹³ Indeed, Gould's story suggests how we might now think about boundaries and so space and time in the contemporary city. What would cities be like if we were to think of them as no more than the undefined middle of a continuum? For example, how might we think of London or New York if we think of them as a continuum? If we were to change our mind-set to accept this idea, would we be more likely to agree with journalists (McGuire and Chan,

2000) that New York and London are losing their specificity by becoming one bicontinental megalopolis (which perhaps could be called NY-LON)? Let me think a little bit more about this continuum and rejection of boundaries that Gould points to because, as Foucault (1977: 34) himself observed, '... a limit could not exist if it were absolutely uncrossable ...'.

The theoretical vocabulary and language of political economy is that of nests of scales that draw boundaries and define or categorize territories as local, regional, national or global. But such a discourse of scalar and territorial relativization stems flow, and so is antithetical to a topology of circulation and network folding. To visualize the shift I am

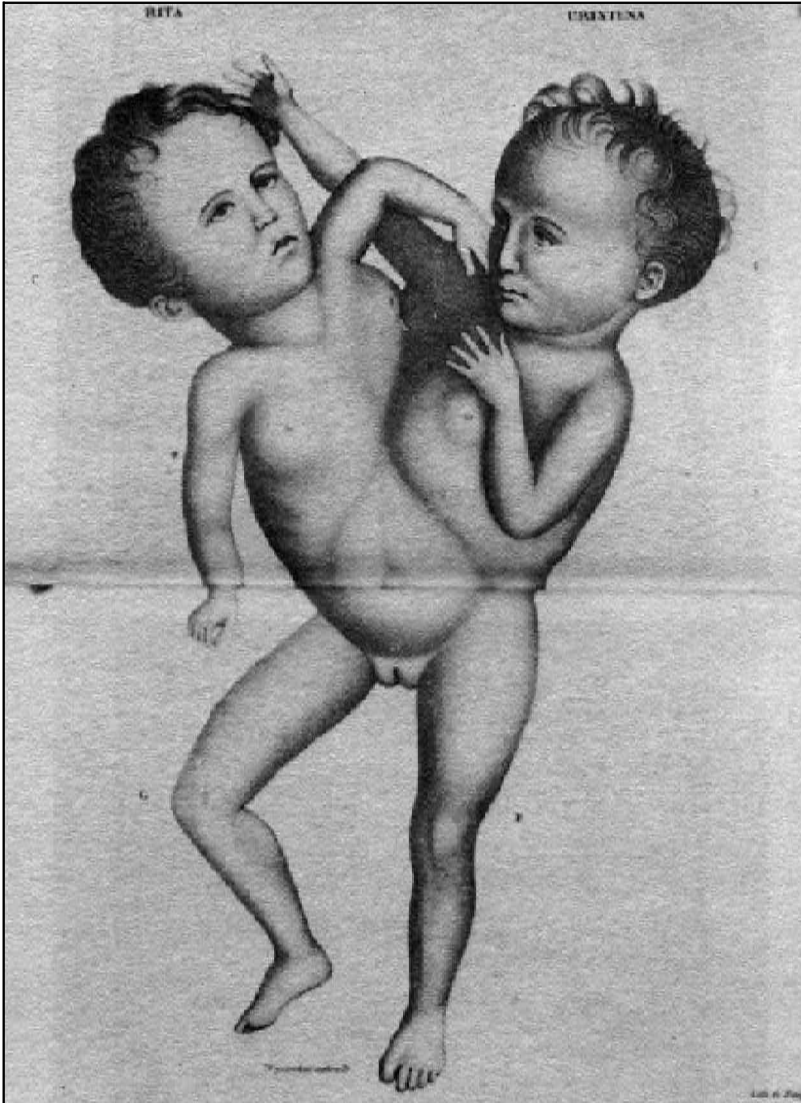


Figure 1 Challenging boundaries: Ritta-Christina
Source: Gould (1991: 201)

proposing, see Figure 2. The diagram visualizes the interaction of two cities. (a) Two cities as separate and bounded entities. They are quite distinct and are reminiscent of how cities were portrayed as hermetically sealed or bounded entities by urbanists such as Mumford and Wirth (though not necessarily Geddes; see Smith, 2003a; cf. Amin and Thrift, 2002). (b) How relations between cities have been conceptualized and investigated by Beaverstock *et al.* (1999; 2000a; 2000b; 2003). We used the idea of in-out ratios to build large data sets of the connections between world cities as part of a network. (c) The idea of 'frontier zones' that Sassen (1999; 2000a; 2000b) has been developing in recent years. It clearly shows Sassen's attempt to develop a new kind of 'area studies' in globalization research as she encourages us to investigate the spaces and times of zones of commonality that are produced when and where geographical scales overlap. (d) A diagram that I have developed from Latour (1993) to try to begin to visualize world cities as 'spatial non-conformities' (Law and Hetherington, 2000), '... as having a fibrous, thread-like, wiry, stringy, ropy, capillary character that is never captured by the notions of levels, layers, territories, spheres, categories, structure, systems' (Latour, 1998: 2). Cities here are hybrid and porous translocal sites that are criss-crossed by the multiple lines of networks that are more or less long and more or less durable. Here a geography such as that produced by Sassen has melted precisely because there is no inside and outside if cities are open intensities where space and time are 'out of joint'.

V World cities as 'Bodies without Organs'

There must be the centre ... no there; but there was no area of sufficient intensity on the skyline to be sure.

Raban (1975: 210)

In his recent 'biography' of London (a task that somehow instinctively makes one think of the city as singular and self-contained), Ackroyd (2001: 1) draws on the age-old metaphor of the body to describe the city:

The image of London as a human body is striking and singular; we may trace it from the pictorial emblems of the City of God, the mystical body in which Jesus Christ represents its head and the citizens its other members. London has also been envisaged in the form of a young man with his arms outstretched in a gesture of liberation; the figure is taken from a Roman bronze but it embodies the energy and exultation of a city continually expanding in great waves of progress and of confidence. Here might be found the 'heart of London beating warm'.

Ackroyd writes of how 'the byways of the city resemble thin veins and its parks are like lungs' (p. 1), and insists that 'Whether we consider London as a young man refreshed and risen from sleep ... or whether we lament its condition as a deformed giant, we must regard it as a human shape with its own laws of life and growth' (p. 2). But is not what Ackroyd is saying rather banal? The view of the city as having parts that function like organs seems quite Victorian and akin to those ideologies of town planning that focus on cities being functional with organ-ized zones. In fact, is not Ackroyd's perspective a little like Sassen's? How else might the city be imagined? How can we think beyond the limits that a metaphor such as the body (with organs) brings?

One of the themes of Deleuze's (Deleuze, 1990; Deleuze and Guattari, 1983; 1987) philosophy (and borrowed from Antonin Artaud) is that of a 'Body without Organs' (BwO) which forms a part of his (and Guattari's) schizoanalysis (these ideas resonate

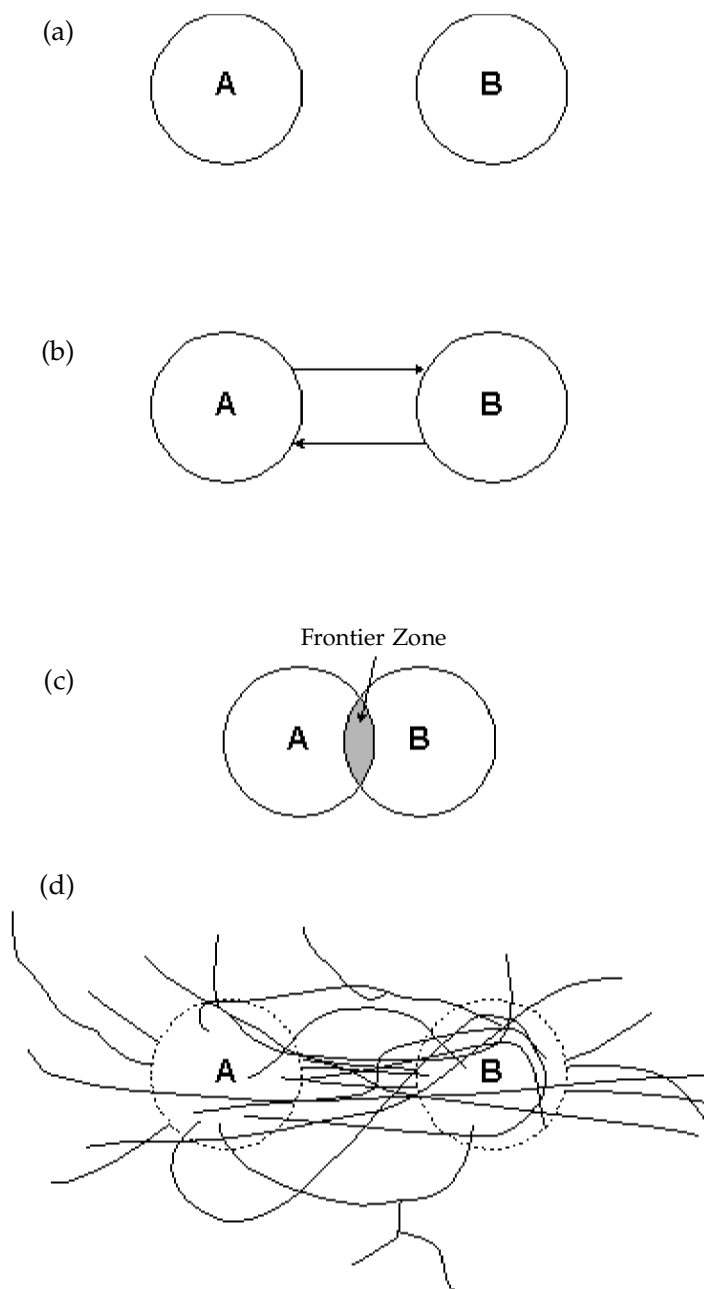


Figure 2 Conceptualizing intercity relations (two world cities: A and B). (a) Spatially bounded cities (e.g., Mumford, 1938, and Wirth, 1938). (b) In-out ratios: connecting world cities (e.g., Beaverstock *et al.*, 2000a; 2000b; 2003). (c) Overlapping cities (scales): analytic borderlands (e.g., Sassen, 1999; 2000a; 2000b). (d) Skein of networks: world cities entangled (inspired by Latour, 1993: 102)

with the deconstruction of Derrida). The purpose of their philosophy is to counter, destabilize, short-circuit any force, power or desire that strives to restrict, capture, fix, manage, redefine, specify or limit the flows that make the world a hotbed of flux and fluidity. In other words, the BwO is best thought of as a way of visualizing the city as unformed, unorganized and non-stratified, as always in the process of formation and deformation and so eluding fixed categories, a transient nomad space-time that does not dissect the city into either segments and 'things' (a reductive Cartesianism) or structures and processes (a reductive political-economy). The BwO is a process of continuous coupling, chains of machines that facilitate endless flow and flux: 'A flow of milk between a breast machine and a mouth machine, or a flow of words between a mouth machine and an ear machine . . .' (Bogue, 1989: 91). In other words, a pathological reductive approach to the city that breaks it apart to produce ever more 'units' for analysis (as in body, chest, sternum, heart, ventricle, etc.) is not for these poststructuralists (see Deleuze and Guattari, 1987, on the differences between smooth deterritorialized space and striated territorialized space). Deleuze would prefer a horizontal ontology where objects are understood by their powers, surfaces and effects (Shields, 1996), and are not explained away by vertical philosophies – such as Realism or Althusserian Marxism – that claim explanatory power by reducing surfaces, appearances, epiphenomena, superstructures, effects to little more than the product of deep underlying structures, systems, processes, forces, socio-economic relations (see Smith, 2003b). The BwO is not like Frankenstein's monster (a composite of stitched-together parts) but is rather an undissected topology of intensities and relations. The point of thinking of the city as a BwO (as an unconstrained flow, a set of relations, an actor-network) is to remind us to think through what it means to stop flows through an organizing principle (e.g., Sassen's scales). By not stopping the flows (everything is made of flows) a new urbanism comes into view that bypasses vertical thinking by refusing to ossify or freeze the flow of the world into unities.

Researching global and world cities as BwOs (a continuum or plane of consistency) breaks with the philosophies, methods and styles of all previous urbanisms and consequently is presented here as an image of thought for a new urbanism that is concerned with a broader analysis, with connection rather than dissection, with the multiple rather than the singular, with the non-linear rather than the linear, with the disproportionate as well as the proportionate, and with the distant as well as the near. In short, the BwO is a way of not losing a city's rhizomatic hybridity, the range of its networks, and so a space-time that '... is always more than "mine, here and now", it is "theirs, then and there"' (Shields, 1996: 243).

VI Ending

The city lives forever unfixed, always in the making, never fully achieved . . . the never finished creation of a time-space.

Massey (1997: 224)

This paper has argued that cities are heterogeneous assemblages of differential relations which vibrate, making, remaking and unmaking the multiple spaces and times of urban networks; or, to quote Latour (1997b: 174), '... time and space are the consequences of the way in which bodies relate to one another'. In this paper, I have attempted to shift

our thinking about world and global cities away from nouns, introversion, the singular and exclusivity to verbs, extroversion, the multiple and connectivity. I have argued that city networks are best understood not through points, lines and boundaries (or the language of clustering, agglomeration and localization; see Amin and Thrift, 2002), but as BwOs, continuous circulations of flux and chaosmosis where there can be no summation and so no integrity. Analogous to Deleuze's rhizome, city networks are in constant movement, undergoing a series of transformations, translations and traductions that defy capture by the exclusionary dualistic thinking of non-poststructuralist social theory.

In short, this paper contributes to the development of a 'new urbanism' in that it is attempting to transform the theory that drives the global and world cities literatures. The dominant theoretical ideas in the field of global/world cities research have remained unchanged for decades. Those following world-systems analysis (e.g., writers such as Friedmann and Taylor) or political economy (e.g., writers such as Castells and Sassen) are keen to talk about, or simply measure (if in fact they are doing that at all), global/world city networks without questioning the fundamental contradiction that the theories they follow were never designed to take the idea of networks seriously. Quite simply, this paper is an attempt to do something new and simultaneously to demonstrate that these dominant theories are at best not helping us make progress in understanding city networks, and at worst propelled just by inertia, like the *grande machine* in Alfred Jarry's novel *Le Surmâle* (1945) motivated by the cadaveric rigour of its cyclists, or, as Hegel put it, by 'the life moving within itself, of that which is dead'.

VII Alternate ending

Increasingly cities are redescribed as transient, nomad space-times.

Thrift (1993: 236)

With this paper, and other papers (Smith, 2003a; 2003b), I am beginning to work out a new research agenda (an alternative tradition) for globalization and global/world cities research. I am starting to argue that after coming to a virtual 'dead stop' (Thrift, 1998) this research field can be restarted through an engagement with, and a development of, poststructuralist theory, actor-network theory, non-representational theory and complexity theory. As an alternate ending, I will briefly point to some of the beginnings or possibilities that these theories offer for further progress.

1 Poststructuralism

Deleuze's philosophy is above all one of connections (see Rajchman, 2000), and the idea that we know the world because we are connected with it (rather than the more conventional idea that we know 'the real world' through objective knowledge). The BwO provides us with a way to visualize the connectivity of global and world cities in a less spatially and temporally regular world. The BwO does not have form or function, it is not a singularity, not a subject or even an object. Rather the BwO is an actor-network, a set of all kinds of relations, a spatial formation that embodies those topologies of movement that are concerning so many social sciences these days: fluids, flows, folds

and networks. In short, the BwO is how I visualize global and world cities because the focus is on relations and a refusal to ossify or freeze the flow of the world into unities.

2 Actor-network theory

Global networks, space and time, are not static, fixed, given, but are made, remade and unmade. With ANT, global and world cities can be viewed and researched as 'switchers' (as middles, intermediaries, *in* networks), rather than centres of 'command and control' as Sassen (1991; 1994) supposes. The idea that global cities somehow 'command and control' the global economy is a highly problematic idea (see Thrift, 1998), and it seems far more likely that global and world cities follow a networking logic than a command logic. From a Latourian perspective, a city is comprised of networks of relations¹⁴ that are made up of humans, non-humans and representations that are all important in the functioning and maintenance of those networks (see, for example, Latour and Hermant, 1998). The capacity of a global or world city to 'command and control' is governed by its participation as a 'switcher' in networks because power is only exercised through any actant's ability to enrol and mobilize others to perform in 'their' network. Consequently a successful network is an arrangement that enrolls actants to produce apparently stable patterns of purpose and action. In short, I think that global and world cities are 'switches', intermediaries, 'middles' in a continuum (think of 'Ritta-Christina').

3 Non-representational theory

Deleuze's philosophy and ANT point towards non-representational thought because they emphasize knowing through connection and participation. Non-representational theory is important because it reminds us to take the 'doings' (the performances and practices) of actants in networks seriously. What is more, it reminds us that what matters might not be written down, but may be non-cognitive, improvised or learned behaviour that is *as yet unrecorded*. Remembering the as yet unrecorded is important when thinking about how one should go about conducting empirical research into global and world city networks. In short, I think that what many people have considered to be unimportant is potentially very important. That brings me on to complexity theory and the ideas of disproportionality and emergence.

4 Complexity theory

Global and world cities are caught up in highly complex open-ended networks that are replete with space-time paths. Consequently, it is obvious that theories need to be developed that can somehow 'deal' with hypercomplexity. Poststructuralism and ANT (see Law, 1999) do handle complexity. For example, Deleuze's philosophy of the fold enables one to appreciate that the world is *complicated*: 'The multiple is not only what has many parts but also what is folded in many ways' (1993: 3). Folds are indeed everywhere, but it also seems to me that Deleuze and ANT are not enough and some of the ideas coming out of complexity theory might be tremendously useful for global

urban studies. For example, complexity theory both offers a new way to conceptualize the *disproportionality* of global networks and introduces the idea of *emergence* (rather than ideas of 'shifts' in scale) which might well provide us with a way to avoid not seeing 'the wood for the trees' when we focus on the details of this or that network in our empirical research. In short, I think that through these theories progress can again be made in the field of global and world city research.

Acknowledgements

I presented several of the ideas in this paper at the 3rd International Conference of Critical Geography in Hungary (June 2002) and would like to thank the panel and audience for their interest and questions. Thank you to the referees for their comments.

Notes

1. A small but identifiable 'complexity turn' is taking place in the social sciences (see Byrne, 1998; Manson, 2001; Thrift, 1999). To an extent this has emerged in the context of the *Gulbenkian Commission on the Restructuring of the Social Sciences* (Wallerstein, 1996). However, it is strange that these non-linear ideas are only now starting to be introduced to the study of globalization (see Law and Urry, 2002; Urry, 2003).

2. John Urry has produced a manifesto for sociology that is influenced by many currents of thought including ideas from ANT. In *Sociology beyond societies* (2000a) Urry introduces some of the ideas of ANT to challenge mainstream sociology. For Urry globalization has rendered much of sociology redundant because it is based on a conceptualization of society as a set of 'bounded institutions'. In contrast, he argues for a 'sociology of mobilities' that is based around the idea of global movement and flow. That argument for a full-blown globalization is now well known. What is more provocative is Urry's use of ANT to outline a 'postsocietal' world that is made up of hybrid assemblages of humans, objects, machines and technologies because quite simply, '... it is *inhuman* objects that reconstitute social relations' (p. 14). The key point then is that the non-human is vital to understand networks (of whatever length, thickness or duration) because networks are made of social relations; 'Such relations are made and remade through machines, technologies, objects, texts, images, physical environments and so on. Human powers increasingly derive from the complex interconnections of humans with material objects, including signs, machines, technologies, texts, physical environments, animals, plants, and waste products. People possess few powers which are uniquely human, while most can only be realized because of their connections with these inhuman components' (p. 14). In short, for Urry and other ANT enthusiasts who follow writers such as Latour and Callon, the classic dualisms of sociology and social theory are inadequate for grasping the complexity of networks and their spatiotemporal topologies (see also Urry, 2003).

3. In human geography Amin and Thrift (2002) have tried to recast cities in light of poststructuralism, ANT and non-representational theory. Like Urry's attempt to develop the idea of boundless societies they argue for a reimagining of the sociologies and geographies of the city. This reimagining sees the city, not as a bounded and humane place of face-to-face interaction, but as an assemblage of scattered sites and circulations. With globalization the city as a bounded site is viewed as a thing of the past. That is not all, because as a part of a new urbanism Amin and Thrift want to imagine the city not only as everywhere but also as populated by both humans and non-humans, as a place of mobility, flow and everyday practices.

4. What I think of as a world city has more to do with the original open and broad formulations proposed by writers such as Geddes (1915) and Hall (1966). This is in stark contrast to the narrow economic definitions adopted by writers such as Hymer (1972), Reed (1981) and Friedmann (1986; 1995) who have tended to define world cities as '... simply the apexes of the formal corporate

hierarchies of national corporations and transnational banks' (Thrift, 1993: 233), or the reduction of global cities to agglomerations of corporate services by writers such as Cohen (1981) and Sassen (1991). In fact, the drift of this work and other papers (Smith, 2003a; 2003b) is away from categorizing cities at all. The categories of 'world' or 'global' city are becoming more and more meaningless.

5. Thrift (1998) contends that the world cities literature has become reduced to an obsession with ranking cities according to their 'world city-ness' (see Thrift, 1993, for more roundabouts in urban studies). It is true that, following the agenda set out by writers such as Friedmann (Friedmann, 1986; 1995; Friedmann and Wolff, 1982) with his world city hierarchy and now Beaverstock *et al.* (2000a) with their world city network, researchers have concentrated on measuring world cities. It is also true that this measurement has historically tended to be according to what world cities contain (e.g., TNC headquarters (Friedmann, 1986) and/or advanced producer services (Sassen, 1991; 1994)). However, it is not true as Thrift contends (though it probably was true at the time Thrift wrote the article) that, 'We seem to have been left only with endless speculations on which cities are the next world cities and which cities will fall out of the pack . . .' (see Short *et al.*, 1996). Rather the 'measurement' research agenda has been moved forward through the generation of relational connective data and consequently does no longer simply 'speculate' as to a world city's position in a global network (e.g., Taylor, 2001; Taylor *et al.*, 2001). However, that is not to say that this new research is not without considerable problems and that is why I view my early research on world cities (Beaverstock *et al.*, 1999; 2000a; 2000b; 2003) as a kind of empirical ground-clearing that has opened up a space for research in the field of global and world cities that engages with and develops ideas from poststructuralism, actor-network theory non-representational theory, and complexity theory.

6. With the exception of a chapter by Thrift, the edited book *Timing global cities* (Gravesteijn *et al.*, 1998) is notable for its lack of consideration of time and the temporalities of cities (see Smith, 2000). Time remains a severely neglected topic in the global and world cities literature, and not just in the here-and-now, as we also lack histories that illuminate the many times and spaces of world cities.

7. It is somewhat unorthodox to jump into a discussion of space with Dandieu, but I have done so because he provides an interesting preface to the ideas of Foucault, Bataille, Spierri, Deleuze and Latour. There are, of course, many other ways of thinking about space: see Plato, Galileo, Descartes, Leibniz, Kant, Newton, Bergson and Einstein, to name just a few (see Dainton, 2001). Alternatively, in human geography the ideas of many social and cultural theorists have been considered to produce new ways of 'thinking space' (for a flavour of some of the possibilities, see Crang and Thrift, 2000).

8. I am not suggesting that space and time can be separated (see also Massey, 1997). Recently May and Thrift (2001) emphasized this point through the promotion of the co-joined term 'TimeSpace'. In fact, this basic point is often made by many authors who write of 'space-time' or 'time-space'.

9. This statement runs against the idea of a global metric of space-time as established in 1884 at the first International Meridian Conference (for a discussion, see Short, 2001; Nguyen, 1992).

10. For an introduction to the main contributions of social theory to conceptualizing time and space see Urry (2000a: 105–30; 2000b).

11. The linearity of time is often contradicted by the digital clocks found in many technologies. Somehow time seems to deviate from the time-line by either 'falling behind' or 'racing ahead'. Many of the people reading this have probably had the experience of voicemail messages being left before they were spoken, or emails that have arrived before they were sent. Having such an experience does not, of course, challenge the irreversibility of time.

12. On a recent visit to Phnom Penh (the capital of Cambodia) I was struck by the city's attempts to invoke linkages to global and world cities (see also Shatkin, 1998). At the airport, at company and hotel reception desks, and even in some bars along the Tonlé Sap River, rows of clocks are commonly displayed with Phnom Penh time juxtaposed to time in London, New York and Tokyo.

13. 'Ritta-Christina' are a kind of proto-BwO. Not a unity, a singularity, a single entity, a being, an essence, a centring, a figure that is One, or the Same, but a continuum, a *collectif*, a plane of consistency, and a way of ' . . . saying and and without an equals sign' (Hetherington, 1998: 157). There is no adding up as a part of a cumulative process where small numbers are eventually summed up into a whole (1 + 1 + 1 + 1, etc.), there is no 'god trick', a dialectical manoeuvre where the many are reduced to the one. Rather 'Ritta-Christina' are a heterogeneous assemblage, a multiplicity where complexity, folding and rhizomatic connections are highlighted rather than hidden. The co-joined twins force us

to consider both what is present and absent and consequently perhaps remind us of Hetherington's (1998: 159) attempts to rethink identity (after Deleuze): 'How do we think about identity in non-Euclidean ways that allow for conditions of topological complexity to be expressed?' Indeed, let us focus on processes and flows rather than breaks or ruptures because maybe then we can begin to work out an answer for Law (1999: 10) who asks: 'How to talk about objects (like theories) that are more than one and less than many? How to *talk about* complexity, to *appreciate* complexity, and to *practise* complexity?'

14. The works of Foucault (1986) and Augé (1995; 1996; 1999) offer a starting-point for more detailed research on the 'non-places' that stitch together world city networks. The 'non-places' (such as ports and airports) that function to facilitate departures and arrivals and so bind spaces together, the infrastructure that facilitates the movement of 'mobile intermediaries' (such as ships and planes) are part of the wider spatial ordering of the networks that produce space. A better understanding of these links would reinforce the argument that geographies are not mere backgrounds filled by histories (cue historical materialism), but rather that geographies are constantly being made through actant-networks (a relational materialism).

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